

## CLAIMS

We claim:

1. An antibody or an antigen-binding fragment thereof that specifically binds the capsular polysaccharide of *Streptococcus pneumoniae* serotype 3 (*S. pneumoniae* PPS-3), wherein said antibody or fragment comprises a heavy chain amino acid sequence comprising an amino acid sequence selected from the group consisting of:
  - (a) the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 1;
  - (b) the amino acid sequence of residues 31 to 104, inclusive, of the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 1; and
  - (c) the CDR1, CDR2 and CDR3 amino acid sequences encoded by the DNA sequence set forth in SEQ ID NO: 1.
2. An antibody or an antigen-binding fragment thereof that specifically binds the capsular polysaccharide of *Streptococcus pneumoniae* serotype 3 (*S. pneumoniae* PPS-3), wherein said antibody or fragment comprises a light chain amino acid sequence comprising an amino acid sequence selected from the group consisting of:
  - (a) the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 2;
  - (b) the amino acid sequence of residues 24 to 97, inclusive, of the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 2; and
  - (c) the CDR1, CDR2 and CDR3 amino acid sequences encoded by the DNA sequence set forth in SEQ ID NO: 2.
3. The antibody or antigen binding fragment according to claim 1, further comprising a light chain amino acid sequence, said light chain amino acid sequence comprising an amino acid sequence selected from the group consisting of:
  - (a) the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 2;
  - (b) the amino acid sequence of residues 24 to 97, inclusive, of the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 2; and

- (c) the CDR1, CDR2 and CDR3 amino acid sequences encoded by the DNA sequence set forth in SEQ ID NO: 2.
- 4. A nucleic acid molecule comprising a nucleotide sequence encoding an amino acid sequence selected from the group consisting of:
  - (a) the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 1;
  - (b) the amino acid sequence of residues 31 to 104, inclusive, of the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 1; and
  - (c) the CDR1, CDR2 and CDR3 amino acid sequences encoded by the DNA sequence set forth in SEQ ID NO: 1.
- 5. A nucleic acid molecule comprising a nucleotide sequence selected from the group consisting of:
  - (a) the DNA sequence set forth in SEQ ID NO: 1;
  - (b) the CDR1-CDR3 encoding DNA sequence of SEQ ID NO: 1; and
  - (c) the CDR1, CDR2 and CDR3 encoding DNA sequence of SEQ ID NO: 1.
- 6. A nucleic acid molecule comprising a nucleotide sequence encoding an amino acid sequence selected from the group consisting of:
  - (a) the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 2;
  - (b) the amino acid sequence of residues 24 to 97, inclusive, of the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 2; and
  - (c) the CDR1, CDR2 and CDR3 amino acid sequences encoded by the DNA sequence set forth in SEQ ID NO: 2.
- 7. A nucleic acid molecule comprising a nucleotide sequence selected from the group consisting of:
  - (a) the DNA sequence set forth in SEQ ID NO: 2;

- (b) the CDR1-CDR3 encoding DNA sequence of SEQ ID NO: 2; and
- (c) the CDR1, CDR2 and CDR3 encoding DNA sequence of SEQ ID NO: 2.

8. An antibody or an antigen-binding fragment thereof that specifically binds the capsular polysaccharide of *Streptococcus pneumoniae* serotype 3 (*S. pneumoniae* PPS-3), wherein said antibody or fragment comprises a heavy chain amino acid sequence comprising an amino acid sequence selected from the group consisting of:

- (a) the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 3;
- (b) the amino acid sequence of residues 31 to 108, inclusive, of the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 3; and
- (c) the CDR1, CDR2 and CDR3 amino acid sequences encoded by the DNA sequence set forth in SEQ ID NO: 3.

9. An antibody or an antigen-binding fragment thereof that specifically binds the capsular polysaccharide of *Streptococcus pneumoniae* serotype 3 (*S. pneumoniae* PPS-3), wherein said antibody or fragment comprises a light chain amino acid sequence comprising an amino acid sequence selected from the group consisting of:

- (a) the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 4;
- (b) the amino acid sequence of residues 24 to 97, inclusive, of the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 4; and
- (c) the CDR1, CDR2 and CDR3 amino acid sequences encoded by the DNA sequence set forth in SEQ ID NO: 4.

10. The antibody or antigen binding fragment according to claim 8, further comprising a light chain amino acid sequence, said light chain amino acid sequence comprising an amino acid sequence selected from the group consisting of:

- (a) the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 4;

- (b) the amino acid sequence of residues 24 to 97, inclusive, of the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 4; and
  - (c) the CDR1, CDR2 and CDR3 amino acid sequences encoded by the DNA sequence set forth in SEQ ID NO: 4.
11. A nucleic acid molecule comprising a nucleotide sequence encoding an amino acid sequence selected from the group consisting of:
- (a) the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 3;
  - (b) the amino acid sequence of residues 31 to 108, inclusive, of the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 3; and
  - (c) the CDR1, CDR2 and CDR3 amino acid sequences encoded by the DNA sequence set forth in SEQ ID NO: 3.
12. A nucleic acid molecule comprising a nucleotide sequence selected from the group consisting of:
- (a) the DNA sequence set forth in SEQ ID NO: 3;
  - (b) the CDR1-CDR3 encoding DNA sequence of SEQ ID NO: 3; and
  - (c) the CDR1, CDR2 and CDR3 encoding DNA sequence of SEQ ID NO: 3.
13. A nucleic acid molecule comprising a nucleotide sequence encoding an amino acid sequence selected from the group consisting of:
- (a) the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 4;
  - (b) the amino acid sequence of residues 24 to 97, inclusive, of the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 4; and
  - (c) the CDR1, CDR2 and CDR3 amino acid sequences encoded by the DNA sequence set forth in SEQ ID NO: 4.
14. A nucleic acid molecule comprising a nucleotide sequence selected from the group consisting of:

- (a) the DNA sequence set forth in SEQ ID NO: 4;
- (b) the CDR1-CDR3 encoding DNA sequence of SEQ ID NO: 4; and
- (c) the CDR1, CDR2 and CDR3 encoding DNA sequence of SEQ ID NO: 4.

15. An antibody or an antigen-binding fragment thereof that specifically binds the capsular polysaccharide of *Streptococcus pneumoniae* serotype 3 (*S. pneumoniae* PPS-3), wherein said antibody or fragment comprises a heavy chain amino acid sequence comprising an amino acid sequence selected from the group consisting of:

- (a) the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 5;
- (b) the amino acid sequence of residues 31 to 104, inclusive, of the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 5; and
- (c) the CDR1, CDR2 and CDR3 amino acid sequences encoded by the DNA sequence set forth in SEQ ID NO: 5.

16. An antibody or an antigen-binding fragment thereof that specifically binds the capsular polysaccharide of *Streptococcus pneumoniae* serotype 3 (*S. pneumoniae* PPS-3), wherein said antibody or fragment comprises a light chain amino acid sequence comprising an amino acid sequence selected from the group consisting of:

- (a) the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 6;
- (b) the amino acid sequence of residues 24 to 97, inclusive, of the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 6; and
- (c) the CDR1, CDR2 and CDR3 amino acid sequences encoded by the DNA sequence set forth in SEQ ID NO: 6.

17. The antibody or antigen binding fragment according to claim 1, further comprising a light chain amino acid sequence, said light chain amino acid sequence comprising an amino acid sequence selected from the group consisting of:

- (a) the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 6;
- (b) the amino acid sequence of residues 24 to 97, inclusive, of the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 6; and
- (c) the CDR1, CDR2 and CDR3 amino acid sequences encoded by the DNA sequence set forth in SEQ ID NO: 6.

18. A nucleic acid molecule comprising a nucleotide sequence encoding an amino acid sequence selected from the group consisting of:

- (a) the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 5;
- (b) the amino acid sequence of residues 31 to 104, inclusive, of the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 5; and
- (c) the CDR1, CDR2 and CDR3 amino acid sequences encoded by the DNA sequence set forth in SEQ ID NO: 5.

19. A nucleic acid molecule comprising a nucleotide sequence selected from the group consisting of:

- (a) the DNA sequence set forth in SEQ ID NO: 5;
- (b) the CDR1-CDR3 encoding DNA sequence of SEQ ID NO: 5; and
- (c) the CDR1, CDR2 and CDR3 encoding DNA sequence of SEQ ID NO: 5.

20. A nucleic acid molecule comprising a nucleotide sequence encoding an amino acid sequence selected from the group consisting of:

- (a) the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 6;
- (b) the amino acid sequence of residues 24 to 97, inclusive, of the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 6; and
- (c) the CDR1, CDR2 and CDR3 amino acid sequences encoded by the DNA sequence set forth in SEQ ID NO: 6.

21. A nucleic acid molecule comprising a nucleotide sequence selected from the group consisting of:

- (a) the DNA sequence set forth in SEQ ID NO: 6;
- (b) the CDR1-CDR3 encoding DNA sequence of SEQ ID NO: 6; and
- (c) the CDR1, CDR2 and CDR3 encoding DNA sequence of SEQ ID NO: 6.

22. An antibody or an antigen-binding fragment thereof that specifically binds the capsular polysaccharide of *Streptococcus pneumoniae* serotype 3 (*S. pneumoniae* PPS-3), wherein said antibody or fragment comprises a heavy chain amino acid sequence comprising an amino acid sequence selected from the group consisting of:

- (a) the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 7;
- (b) the amino acid sequence of residues 31 to 105, inclusive, of the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 7; and
- (c) the CDR1, CDR2 and CDR3 amino acid sequences encoded by the DNA sequence set forth in SEQ ID NO: 7.

23. An antibody or an antigen-binding fragment thereof that specifically binds the capsular polysaccharide of *Streptococcus pneumoniae* serotype 3 (*S. pneumoniae* PPS-3), wherein said antibody or fragment comprises a light chain amino acid sequence comprising an amino acid sequence selected from the group consisting of:

- (a) the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 8;
- (b) the amino acid sequence of residues 24 to 97, inclusive, of the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 8; and
- (c) the CDR1, CDR2 and CDR3 amino acid sequences encoded by the DNA sequence set forth in SEQ ID NO: 8.

24. The antibody or antigen binding fragment according to claim 1, further comprising a light chain amino acid sequence, said light chain amino acid sequence comprising an amino acid sequence selected from the group consisting of:

- (a) the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 8;
- (b) the amino acid sequence of residues 24 to 97, inclusive, of the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 8; and
- (c) the CDR1, CDR2 and CDR3 amino acid sequences encoded by the DNA sequence set forth in SEQ ID NO: 8.

25. A nucleic acid molecule comprising a nucleotide sequence encoding an amino acid sequence selected from the group consisting of:

- (a) the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 7;
- (b) the amino acid sequence of residues 31 to 105, inclusive, of the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 7; and
- (c) the CDR1, CDR2 and CDR3 amino acid sequences encoded by the DNA sequence set forth in SEQ ID NO: 7.

26. A nucleic acid molecule comprising a nucleotide sequence selected from the group consisting of:

- (a) the DNA sequence set forth in SEQ ID NO: 7;
- (b) the CDR1-CDR3 encoding DNA sequence of SEQ ID NO: 7; and
- (c) the CDR1, CDR2 and CDR3 encoding DNA sequence of SEQ ID NO: 7.

27. A nucleic acid molecule comprising a nucleotide sequence encoding an amino acid sequence selected from the group consisting of:

- (a) the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 8;
- (b) the amino acid sequence of residues 24 to 97, inclusive, of the amino acid sequence encoded by the DNA sequence set forth in SEQ ID NO: 8; and
- (c) the CDR1, CDR2 and CDR3 amino acid sequences encoded by the DNA sequence set forth in SEQ ID NO: 8.



28. A nucleic acid molecule comprising a nucleotide sequence selected from the group consisting of:

- (a) the DNA sequence set forth in SEQ ID NO: 8;
- (b) the CDR1-CDR3 encoding DNA sequence of SEQ ID NO: 8; and
- (c) the CDR1, CDR2 and CDR3 encoding DNA sequence of SEQ ID NO: 8.

29. The nucleic acid molecule according to any one of claims 4-7, 11-14, 18-21 or 25-28, operably linked to an expression control sequence.

30. A host cell transformed with a nucleic acid molecule according to claim 29.

31. A method for producing an antibody or an antigen binding fragment thereof that specifically binds *S. pneumoniae* PPS-3, comprising the step of culturing a host cell according to claim 30.

32. A host cell transformed with a nucleic acid molecule according to any one of claims 4-7, 11-14, 18-21 or 25-28.

33. A method for producing an antibody or an antigen binding fragment thereof that specifically binds *S. pneumoniae* PPS-3, comprising the step of culturing a host cell according to claim 32.

34. A composition comprising the antibody or antigen-binding fragment thereof according to any one of claims 1-3, 8-10, 15-17 or 22-24, and a pharmaceutically acceptable carrier.

35. The composition according to claim 34, further comprising a component selected from the group consisting of:

- (a) a diagnostic agent; and
- (b) a therapeutic agent.

36. The composition according to claim 34, further comprising one or more additional antibodies or antigen-binding fragments thereof, wherein said additional antibodies specifically bind *S. pneumoniae* serotypes other than serotype 3.
37. A kit comprising the antibody or antigen-binding fragment thereof according to any one of claims 1-3, 8-10, 15-17 or 22-24.
38. A method for preventing or reducing the severity of conditions or disorders caused by *S. pneumoniae* serotype 3 infection in a subject comprising the step of administering an effective amount of the antibody or antigen-binding fragment thereof according to any one of claims 1-3, 8-10, 15-17 or 22-24 or a composition according to any one of claims 34-36.
39. The method according to claim 38, wherein the subject is immunocompromised.
40. The method according to claim 38 or 39, wherein the subject is infected with HIV-1.
41. A method for increasing the resistance of a subject to infection by *S. pneumoniae* serotype 3 or to conditions or disorders caused by such infection, comprising the step of administering the antibody or antigen-binding fragment thereof according to any one of claims 1-3, 8-10, 15-17 or 22-24 or a composition according to any one of claims 34-36.
42. A method for enhancing deposition of complement onto *S. pneumoniae* serotype 3 cells in a subject comprising the step of administering the antibody or antigen-binding fragment thereof according to any one of claims 1-3, 8-10, 15-17 or 22-24 or a composition according to any one of claims 34-36.
43. A method for increasing phagocytosis of *S. pneumoniae* serotype 3 in a subject comprising the step of administering the antibody or fragment thereof according to any one of claims 1-3, 8-10, 15-17 or 22-24 or a composition according to any one of claims 34-36.

44. The method according to any one of claims 38-43, wherein the anti-*S. pneumoniae* PPS-3 antibody or antigen-binding fragment thereof is administered in conjunction with the administration of another therapeutic agent.
45. A method for detecting *S. pneumoniae* serotype-3 infection comprising contacting a sample from a subject suspected of being infected with an antibody or antigen-binding fragment according to any one of claims 1-3, 8-10, 15-17 or 22-24 and detecting the binding of said antibody or fragment to *S. pneumoniae* serotype 3.
46. A method for determining the *S. pneumoniae* serotype in a subject infected with *S. pneumoniae* comprising the step of contacting *S. pneumoniae* isolated from the subject with the antibody or antigen-binding portion thereof according to any one of claims 1-3, 8-10, 15-17 or 22-24 and detecting the presence or absence of binding.
47. An isolated human antibody that specifically binds the capsular polysaccharide of *S. pneumoniae* serotype 3 (PPS-3) or an antigen-binding fragment thereof, wherein said antibody or antigen-binding fragment binds the same epitope of PPS-3 as an antibody according to any one of claims 3, 10, 17 or 24.